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FACT SHEET FOR NPDES PERMIT WA-004514-4

Liberty Lake Sewer & Water District

SUMMARY

The Liberty Lake Sewer and Water District owns and operates an extended aeration-activated sludge treatment facility designed to provide biological nutrient removal. The wastewater facility has a design flow of 2 million gallons per day (MGD) but is currently authorized to only operate up to 1 MGD. The TMDL bases loading on a flow of 1.51 MGD and flow estimate project a flow of 1.41 MGD in 2017.

The discharge of UV disinfected effluent is to the Spokane River approximately 3.5 miles downstream from the Washington/Idaho border. The system collects and treats the sanitary wastewater from approximately 4,018 ERUs (Equivalent Residential Units) in 2009 as well as commercial and light industrial dischargers. The original facility went online in August 1982. Construction of a substantial facility upgrade began in fall of 2004 and was completed in spring of 2006. The current average monthly effluent flow is approximately 0.731 MGD.

There is an approved metals TMDL for the Spokane River for Cadmium, Lead, and Zinc. The river is also listed on the state's 303(d) list for exceeding water quality criteria for several parameters including Dissolved Oxygen and PCB's.

The issuance of this permit is being timed to follow the approval of the Spokane River and Lake Spokane Dissolved Oxygen (DO) TMDL by the US EPA. This permit implements the Spokane River and Lake Spokane DO TMDL, the associated waste load allocations and managed implementation plan.

The proposed permit contains a compliance schedule for upgrading the treatment process for Phosphorus removal and has interim and final limits for Ammonia, CBOD₅ and Total Phosphorus. Water quality-based limits have been added for Lead, and Zinc according to the procedures in the metals TMDL. The permit limit for Cadmium is a performance based limit per the metals TMDL.

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I. INTRODUCTION

The Federal Clean Water Act (FCWA, 1972, and later modifications, 1977, 1981, and 1987) established water quality goals for the navigable (surface) waters of the United States. One of the mechanisms for achieving the goals of the Clean Water Act is the National Pollutant Discharge Elimination System of permits (NPDES permits), which is administered by the Environmental Protection Agency (EPA). The EPA has authorized the State of Washington to administer the NPDES permit program. Chapter 90.48 RCW defines the Department of Ecology's authority and obligations in administering the wastewater discharge permit program.

The regulations adopted by the State include procedures for issuing permits (Chapter 173-220 WAC), technical criteria for discharges from municipal wastewater treatment facilities (Chapter 173-221 WAC), water quality criteria for surface and ground waters (Chapters 173-201A and 200 WAC), and sediment management standards (Chapter 173-204 WAC). These regulations require that a permit be issued before discharge of wastewater to waters of the state is allowed. The regulations also establish the basis for effluent limitations and other requirements which are to be included in the permit. One of the requirements (WAC 173-220-060) for issuing a permit under the NPDES permit program is the preparation of a draft permit and an accompanying fact sheet. Public notice of the availability of the draft permit is required at least thirty days before the permit is issued (WAC 173-220-050). The fact sheet and draft permit are available for review (see **Appendix A - Public Involvement** of the fact sheet for more detail on the Public Notice procedures).

The fact sheet and draft permit have been reviewed by the Permittee. Errors and omissions identified in this review have been corrected before going to public notice. After the public comment period has closed, the Department will summarize the substantive comments and the response to each comment. The summary and response to comments will become part of the file on the permit and parties submitting comments will receive a copy of the Department's response. Comments and the resultant changes to the permit will be summarized in **Appendix D - Response to Comments**.

<u>GENERAL INFORMATION</u>	
Applicant:	Liberty Lake Sewer and Water District
Facility Name and Address:	Liberty Lake Water Reclamation Facility 1926 N. Harvard Road Liberty Lake, WA 99019
Type of Treatment:	Extended aeration, tertiary for biological nutrient removal and UV disinfection
Discharge Location:	Spokane River (RM. 92.3) Latitude: 47° 40' 42" N Longitude: 117° 07' 00" W.
Water Body ID Number:	WA-57-1010

II. BACKGROUND INFORMATION

A. DESCRIPTION OF THE FACILITY

HISTORY

In an effort to improve the water quality of Liberty Lake (Spokane County), a wastewater collection and treatment system was approved in 1973. This system replaced existing on-site septic systems that serviced permanent and seasonal homes along the shoreline and in the vicinity of the lake. A facility plan was prepared in 1976 (*Entranco Engineers*) and amended in 1978 (*Kennedy Consulting Engineers*) for a wastewater treatment plant. The treatment facility was completed and came on-line in August 1982.

Facility planning started in 2000 for an upgrade to accommodate growth, nitrogen removal and biological phosphorus removal requirements and allowed provisions for subsequent additional physical chemical phosphorus removal in anticipation of the Spokane River and Lake Spokane Dissolved Oxygen TMDL.

Construction of a substantial upgrade to the wastewater treatment plant began in the fall of 2004. Construction was completed in June, 2006.

The Liberty Lake Sewer and Water District (LLSWD) (5.3 mi² service area) provides services for a combination of residential, commercial and light industrial customers within the corporate limits of the City of Liberty Lake, and to an unincorporated area adjacent to Liberty Lake (Figure 1). The LLSWD is located south of Interstate 90 approximately mid-way between Spokane and Coeur d'Alene, Idaho.

COLLECTION SYSTEM STATUS

Information presented in the 1995 and 2003 Comprehensive Wastewater Management Plan showed the collection system to be in good to very good condition relative to inflow and infiltration (I&I). The system was constructed with high quality materials and ground water levels are below most of the gravity system. There is a small service area with clay service lines and some older manholes adjacent to the lake contributing some I&I.

TREATMENT PROCESSES

Wastewater enters the facility via a 21" gravity line and is channeled through a fine screen. Influent flow is measured by an ultrasonic weir level sensing system. The treatment facility is designed for a daily average flow of 2 MGD but is only currently authorized for up to 1 MGD. The wastewater treatment facilities will be permitted for 2 MGD and associated loadings upon submission and Department approval of the engineering report demonstrating how the District intends to implement the requirements of the Spokane River Dissolved Oxygen TMDL, and the water quality implementation plan.

Figure 1: LLSWD WWTP



The LLSWD facility is an extended aeration activated sludge treatment system for biological nutrient removal with Class I reliability and redundancy. The wastewater treatment facilities consist of headworks, anaerobic selectors, anoxic basins, aeration basins, four clarifiers, sludge storage with aerated sludge thickening tank, sludge drying (belt filter press) and handling facilities, piping and pump stations and other related, miscellaneous items.

DISCHARGE OUTFALL

Tertiary treated and disinfected effluent is discharged from the facility to the Spokane River (RM 92.3) via a gravity system and through a single port 16" pipe that extends from the bank and into the river.

RESIDUAL SOLIDS

The treatment facilities remove solids during the treatment of the wastewater at the headworks (grit and screenings), and at the secondary clarifiers, in addition to incidental solids (rags, scum, and other debris) removed as part of the routine maintenance of the equipment. Screenings, grit, rags, scum are drained and disposed of as solid waste at the waste to energy plant.

Waste solids from the clarifiers are treated using aerated sludge thickening and belt filter press. The resulting biosolids are trucked off-site for land application.

B. PERMIT STATUS

The previous permit for this facility was issued on August 31, 1998 and amended on March 12, 2001. It was administratively extended pending completion of the Spokane River DO TMDL and Managed Implementation Plan. The previous permit placed effluent limitations on 5-day Biochemical Oxygen Demand (BOD₅), Total Suspended Solids (TSS), pH, Fecal Coliform Bacteria, Total Residual Chlorine and Total Phosphorus.

An application for permit renewal was submitted to the Department on August 30, 2006 and accepted by the Department on September 7, 2006.

C. SUMMARY OF COMPLIANCE WITH THE PREVIOUS PERMIT

The facility received its last compliance inspection on August 10, 2010. The facility was found to be in compliance with limitations and conditions in the permit. During construction several site visits were made. The facility remained in compliance during construction.

Discharge Monitoring Report (DMR) data submitted during the last few years have been reviewed and are summarized in appropriate sections below.

D. WASTEWATER CHARACTERIZATION

The concentration of pollutants in the discharge was reported in the NPDES application and in DMRs. The effluent is characterized from information in the permit application as follows:

Table 1: Wastewater Characterization (from DMR data for Jan. 2008 through Aug. 2009)

Parameter	Concentration
BOD ₅	3.3 mg/L (avg. weekly); 2.6 mg/L (avg. monthly)
TSS	4.3 mg/L (avg. weekly); 3.2 mg/L (avg. monthly)
Fecal Coliforms	A range of 3 to 21/100 ml (avg. weekly); ranges from 2 to 11/100 ml (avg. monthly)
pH	6.81 (min); 7.61 (max)
Flow	1.385 MGD (max daily); 0.706 MGD (avg. monthly)
Ammonia (as N)	0.29 mg/L (avg. weekly); less than 0.17 mg/L (avg. monthly)
DO	2.7 mg/L (minimum daily); 4.9 mg/L (avg. daily)
Total Phosphorus	0.85 mg/L (avg. weekly); 0.60 mg/L (avg. monthly)
Hardness	161 mg/L (max daily); 128.7 mg/L (avg. daily)
Zinc	90.1 ug/L (max daily); 74.3 ug/L (avg. daily)

Parameter	Concentration
Cadmium	0.017 ug/L (max daily); 0.008 ug/L (avg. daily)
Lead	0.386 ug/L (max daily); 0.197 ug/L (avg. daily)
Alkalinity	154 mg/L (max daily); 129.6 mg/L (avg. daily)

Results of a priority pollutant scan of the effluent were also submitted with the permit application. The results include:

Parameter	Concentration
Antimony	ND PQL @ 0.005 mg/L
Arsenic	ND PQL @ 0.005 mg/L
Copper	0.013 mg/L
Lead	ND PQL @ 0.002 mg/L
Mercury	ND PQL @ 0.0005 mg/L
Nickel	ND PQL @ 0.05 mg/L
Zinc	0.129 mg/L
Organic Priority Pollutants	Non Detect except for: Chloroform @ 1.3 ug/L Bis (2-ethylhexyl)phthalate @ 17.0 ug/L
Total Cyanide	ND PQL @ 0.05 mg/L

III. PROPOSED PERMIT LIMITATIONS

Federal and State regulations require that effluent limitations set forth in a NPDES permit must be either technology- or water quality-based. Technology-based limitations for municipal discharges are set by regulation (40 CFR 133, and Chapters 173-220 and 173-221 WAC). Water quality-based limitations are based upon compliance with the Surface Water Quality Standards (Chapter 173-201A WAC), Ground Water Standards (Chapter 173-200 WAC), Sediment Quality Standards (Chapter 173-204 WAC) or the National Toxics Rule (Federal Register, Volume 57, No. 246, Tuesday, December 22, 1992.) The most stringent of these types of limits must be chosen for each of the parameters of concern. Each of these types of limits is described in more detail below.

The limits in this permit are based in part on information received in the application. The effluent constituents in the application were evaluated on a technology and water quality-basis. The limits necessary to meet the rules and regulations of the State of Washington were determined and included in this permit. Ecology does not develop effluent limits for all pollutants that may be reported on the application as present in the effluent. Some pollutants are not treatable at the concentrations reported, are not controllable at the source, are not listed in regulation, and do not have a reasonable potential to cause a water quality violation. Effluent limits are not always developed for pollutants that may be in the discharge but not reported as present in the application. In those circumstances the permit does not authorize discharge of the non-reported pollutants. Effluent discharge conditions may change from the conditions reported in the permit application. If significant changes occur in any constituent, as described in 40 CFR 122.42(a), the Permittee is required to notify the Department of Ecology. The Permittee may be in violation of the permit until the permit is modified to reflect additional discharge of pollutants.

E. DESIGN CRITERIA

In accordance with WAC 173-220-150 (1)(g), flows or waste loadings shall not exceed approved design criteria.

Design criteria typically project anticipated flows and loadings into a wastewater treatment plant over a planning period of twenty years. The design criteria for this treatment facility were taken from the engineering report for the recent upgrade (2001), and the correspondence of April 19, 2004 (Liberty Lake Sewer and Water District Wastewater Treatment Plan Planned Upgrade – Affect on Spokane River Dissolved Oxygen) and are as follows:

Table 2: Design Standards for the Liberty Lake Sewer District WWTP

Parameter	Design Quantity
Monthly average flow (max. month)	2.0 MGD
Maximum daily flow	3.0 MGD
Maximum week flow	2.25 MGD
Peak Hydraulic capacity	4.0 MGD
BOD ₅ influent loading for max. month	6,295 lbs/day
TSS influent loading for max. month	6,322 lbs/day

The DO TMDL based loadings on a flow of 1.51 MGD. Flow projections anticipate a flow of 1.41 MGD in 2017. A flow of 1.41 MGD was used for the interim TP loading in NPDES permit section 1.B Interim phase 2 Effluent Limitations.

F. TECHNOLOGY-BASED EFFLUENT LIMITATIONS

Municipal wastewater treatment plants are a category of discharger for which technology-based effluent limits have been promulgated by federal and state regulations. These effluent limitations are given in the Code of Federal Regulations (CFR) 40 CFR Part 133 (federal) and in Chapter 173-221 WAC (state). These regulations are performance standards that constitute all known available and reasonable methods of prevention, control, and treatment for municipal wastewater.

The following technology-based limits for pH, Fecal Coliform, BOD₅, and TSS taken from Chapter 173-221 WAC are:

Table 3: Technology-Based Limits

Parameter	Limit
pH:	Shall be within the range of 6 to 9 standard units (s.u.).
Fecal Coliform Bacteria	Monthly Geometric Mean = 200 organisms/100 mL Weekly Geometric Mean = 400 organisms/100 mL

Parameter	Limit
BOD ₅ (concentration)	Average Monthly Limit is the most stringent of the following: - 30 mg/L - may not exceed fifteen percent (15%) of the average influent concentration Average Weekly Limit = 45 mg/L
TSS (concentration)	Average Monthly Limit is the most stringent of the following: - 30 mg/L - may not exceed fifteen percent (15%) of the average influent concentration Average Weekly Limit = 45 mg/L

The design memorandum of April 19, 2004 anticipated an effluent of 10 mg/L BOD₅ and actual performance is somewhat better. At an average annual design flow of 1 MGD, the mass limit for the average month is 83.4 lbs/day and the mass limit for the average week is 125.1 lbs/day. At a design flow of 2 MGD (20 yr projection), the mass limit for the average month is 166.8 lbs/day and the mass limit for the average week is 250.2 lbs/day.

The memo did not give a similar projection for TSS. Assuming the performance is similar, at average annual design flow of 1 MGD, the mass limit for the average month is 83.4 lbs/day and the mass limit for the average week is 125.1 lbs/day. At a design flow of 2 MGD, the mass limit for the average month is 166.8 lbs/day and the mass limit for the average week is 250.2 lbs/day. Since approval of the Engineering Report, the draft Spokane River and Lake Spokane DO TMDL and the Managed Implementation Plan have been approved. The flows used for the waste load allocations were projected to the year 2017 and 2027 using information available in 2004 and 2005.

G. SURFACE WATER QUALITY-BASED EFFLUENT LIMITATIONS

In order to protect existing water quality and preserve the designated beneficial uses of Washington's surface waters, WAC 173-201A-060 states that waste discharge permits shall be conditioned such that the discharge will meet established Surface Water Quality Standards. The Washington State Surface Water Quality Standards (Chapter 173-201A WAC) is a state regulation designed to protect the beneficial uses of the surface waters of the state. Water quality-based effluent limitations may be based on an individual waste load allocation (WLA) or on a WLA developed during a basin-wide total maximum daily loading study (TMDL).

NUMERICAL CRITERIA FOR THE PROTECTION OF AQUATIC LIFE

"Numerical" water quality criteria are numerical values set forth in the State of Washington's Water Quality Standards for Surface Waters (Chapter 173-201A WAC). They specify the levels of pollutants allowed in a receiving water while remaining protective of aquatic life. Numerical criteria set forth in the Water Quality Standards are used along with chemical and physical data for the wastewater and receiving water to derive the effluent limits in the discharge permit. When surface water quality-based limits are more stringent or potentially more stringent than technology-based limitations, they must be used in a permit.

NUMERICAL CRITERIA FOR THE PROTECTION OF HUMAN HEALTH

The state was issued 91 numeric water quality criteria for the protection of human health by the U.S. EPA (EPA 1992). These criteria are designed to protect humans from cancer and other disease and are primarily applicable to fish and shellfish consumption and drinking water from surface waters.

NARRATIVE CRITERIA

In addition to numerical criteria, "narrative" water quality criteria (WAC 173-201A-030) limit toxic, radioactive, or deleterious material concentrations below those which have the potential to adversely affect characteristic water uses, cause acute or chronic toxicity to biota, impair aesthetic values, or adversely affect human health. Narrative criteria protect the specific beneficial uses of all fresh (WAC 173-201A-130) and marine (WAC 173-201A-140) waters in the State of Washington.

ANTIDegradation

The State of Washington's Antidegradation Policy requires that discharges into a receiving water shall not further degrade the existing water quality of the water body. In cases where the natural conditions of a receiving water are of lower quality than the criteria assigned, the natural conditions shall constitute the water quality criteria. Similarly, when receiving waters are of higher quality than the criteria assigned, the existing water quality shall be protected. More information on the State Antidegradation Policy can be obtained by referring to WAC 173-201A-070.

The Department has reviewed existing records and is unable to determine if ambient water quality is either higher or lower than the designated classification criteria given in Chapter 173-201A WAC; therefore, the Department will use the designated classification criteria for this water body in the proposed permit. The discharges authorized by this proposed permit should not cause a loss of beneficial uses.

CRITICAL CONDITIONS

Surface water quality-based limits are derived for the waterbody's critical condition, which represents the receiving water and waste discharge condition with the highest potential for adverse impact on the aquatic biota, human health, and existing or characteristic water body uses.

MIXING ZONES

The Water Quality Standards allow the Department of Ecology to authorize mixing zones around a point of discharge in establishing surface water quality-based effluent limits. Both "acute" and "chronic" mixing zones may be authorized for pollutants that can have a toxic effect on the aquatic environment near the point of discharge. The concentration of pollutants at the boundary of these mixing zones may not exceed the numerical criteria for that type of zone. Mixing zones can only be authorized for discharges that are receiving all known, available, and reasonable methods of prevention, control and treatment (AKART) and in accordance with other mixing zone requirements of WAC 173-201A-100.

The National Toxics Rule (EPA, 1992) allows the chronic mixing zone to be used to meet human health criteria.

DESCRIPTION OF THE RECEIVING WATER

The LLSWD facility discharges to the Spokane River with the following use designations (Table 602 of Chapter 173-201A) in this reach of the River:

1. Aquatic life uses (salmonid spawning, rearing, migration);
2. Primary contact recreation;
3. Water supply uses (domestic, industrial, agricultural, stock); and
4. Miscellaneous uses (wildlife habitat, harvesting, commerce/navigation, boating, aesthetics).

Water quality of this class shall meet or exceed the requirements for all or substantially all uses.

The Spokane River begins in northern Idaho at the outlet of Lake Coeur d'Alene and flows west 112 statute miles to the Columbia River. Flows from the lake are regulated by the discharge from Post Falls Dam which is operated by Avista Corporation for power generation. The river flows westward from the dam across the Washington/Idaho border, through several man made reservoirs for power generation, and through the large urban areas of Spokane and Spokane Valley.

The River basin encompasses over 6,000 square miles in Washington and Idaho. Upstream other point sources to the Spokane River are Coeur d'Alene POTW, Post Falls POTW, Hayden Area Regional Sewer Board POTW.

The flow regime for the Spokane River is dictated largely by freezing temperatures in the winter followed by spring and summer snowmelt. The annual harmonic mean flow is approximately 2,154 cfs as the river crosses the Idaho border. Flow increases to 2,896 cfs downstream of Spokane, reflecting the influx of groundwater through this river reach. The recent recertification of Avista's Post Falls dam means a minimum flow of 500 cfs will be maintained at the dam. At Liberty Lake (N. Harvard Rd.) this means a minimum flow of 262 cfs.

From Spokane it again flows into a series of man-made impoundments for power generation with the largest being Long Lake which is located approximately 30 miles northwest of Spokane. The river finally discharges into the Columbia River. Total length of the river is approximately 110 miles.

Significant nearby non-point sources of pollutants include heavy metals pollution from past mining activities in the "Silver Valley" of Idaho. This area is located east of the city of Coeur d'Alene and includes the north and south forks of the Coeur d'Alene River.

SURFACE WATER QUALITY CRITERIA

Applicable criteria are defined in Chapter 173-201A WAC for aquatic biota. In addition, U.S. EPA has promulgated human health criteria for toxic pollutants (EPA 1992).

Criteria for this reach of the river are summarized below:

Fecal Coliforms	100 organisms/100 mL maximum geometric mean.
Dissolved Oxygen	8 mg/L minimum. When a waterbody's D.O. is lower than the criteria (or within 0.2 mg/L of the criteria) and that condition is due to natural conditions, then human actions considered cumulatively may not cause the D.O. of that water body to decrease more than 0.2 mg/L. For lakes, human actions considered cumulatively may not decrease the dissolved oxygen concentration more than 0.2 mg/L below natural conditions.
Temperature	1) 17.5°C average of the daily maximum over 7 days 2) Temperature shall not exceed a 1-DMax of 20.0°C due to human activities. 3) When natural conditions exceed a 1-DMax of 20.0°C, no temperature increase will be allowed which will raise the receiving water temperature by greater than 0.3°C; 4) Nor shall such temperature increases, at any time, exceed $t = 34/(T + 9)$.
pH	6.5 to 8.5 standard units, with a human-caused variation within the above range of less than 0.2 units.
Turbidity	Less than 5 NTUs above background.
Phosphorus	A DO TMDL for the Spokane River includes limitations on phosphorus (see section below).
Metals	A dissolved metals TMDL for cadmium, lead, and zinc has been developed.
Toxics	No toxics in toxic amounts.

In addition, from Long Lake Dam (river mile 33.9) to Nine Mile Bridge (river mile 58.0), the average euphotic zone concentration of total phosphorus (as P) shall not exceed 25 ug/L during the period of June 1 to October 31.

In 1989, the Spokane River Phosphorus Management Plan was adopted to meet the previous total phosphorus standard. This plan set total phosphorus limits for each point source discharger to the Spokane River. These limits only applied during the algal growing season (June 1 to October 31).

The Department routinely assesses available water quality data on a statewide basis. The results are submitted to the Environmental Protection Agency (EPA) as an “integrated report” to satisfy Sections 303(d) and 305(b) of the federal Clean Water Act. This report lists water quality for a particular location in one of five categories, as recommended by EPA.

Categories one through four represent the 305(b) Report which is the overall status of water quality in the State. Category 5 represents waters on the 303(d) list which are the known polluted waters in the State.

A Total Daily Maximum Load (TMDL) must be developed for each water body segment on the 303(d) list. The purpose of a TMDL is to determine the amount of pollution a water body can receive while still meeting water quality standards. Maximum allowable pollution from various sources are established as either individual waste load allocations (WLAs) for points sources or load allocations (LAs) for non-point sources.

For the Spokane River, multiple segments are on the Department's 2004 303(d) list. Water quality is not meeting standards for: Dissolved Oxygen, Temperature, Dissolved Gas, Fecal Coliform Bacteria, Total PCBs, and Dioxin. The DO TMDL report has been approved by the U.S. EPA Region 10 office. The PCB TMDL is still a draft. There are not yet TMDLs prepared for the Temperature, Dissolved Gas, Fecal Coliform Bacteria, and Dioxin listings.

In the 305(b) Report, the Spokane River also includes category 1, 2, and 4a waters. Category 1 waters are where standards are being met; category 2 waters are where the data are not sufficient for listing as impaired, but there still may be a concern about water quality; and category 4a is for waterbodies that have an approved TMDL. There have been approved TMDLs for metals (Cadmium, Lead and Zinc) and Total Phosphorus (discussed above) on the Spokane River.

In response to the dissolved oxygen 303(d) listings, the Department prepared a draft DO TMDL report for the Spokane River and Lake Spokane (Ecology, 2004). The report recommended substantial reductions in the Phosphorus, Carbonaceous Biological Oxygen Demand (CBOD), and Ammonia discharged to the Spokane River from both point and non-point sources. The recommended reductions would apply during the "season" of April through October.

Ecology revised the draft 2004 TMDL and released it for public comment in 2007 and 2008. These 2007 and 2008 TMDL drafts still contained very stringent wasteload allocations, but also accounted for non-point pollution sources, and anticipated that pollutant trading might be used to help the point source dischargers meet their load allocations. Despite this improvement, these draft TMDLs were flawed in two ways:

1. They did not consider Avista's responsibility for the impacts caused by Long Lake Dam.
2. They assumed that the impacts of the Idaho dischargers were set by the NPDES permits EPA had proposed even though those permits did not contain discharge limits stringent enough to meet Washington's water quality standards when considered cumulatively with Washington sources (see Appendix H).

To develop a TMDL that will achieve compliance with Washington water quality standards, Ecology developed a revised TMDL based on modeling that now assesses the cumulative impact of all dischargers and accounts for the impacts of Long Lake Dam on dissolved oxygen in Lake Spokane. Because all the impacts causing the water quality impairment are considered, the proportional share that each discharger bears is less than in earlier draft TMDLs.

The new wasteload allocations for the point source dischargers, assumed reductions in the Idaho discharges, load allocations for non-point sources, and the improvements that Avista will make to mitigate the effect of the dam, give assurance that compliance with water quality standards will be achieved. The final Water Quality Improvement Report was submitted to EPA for approval in February 2010.

The Department also conducted a Total Maximum Daily Load (TMDL) assessment for PCBs in the Spokane River, during 2003-2004. In June, 2006, a draft TMDL report was issued (Ecology, 2006). The draft PCB TMDL is still only a draft. The draft TMDL proposed a loading scenario based on meeting the downstream Spokane Tribe water criterion for PCBs of 3.37 pg/L. This scenario requires a 95% PCB load reduction at the Idaho border, a 97% load reduction in the Little Spokane River, and $\geq 99\%$ reductions in municipal, industrial, and stormwater discharges. PCB's were measured in the Liberty Lake effluent in samples collected in May 2001 (Ecology, 2002); an estimated average value of 1730 pg/L was found.

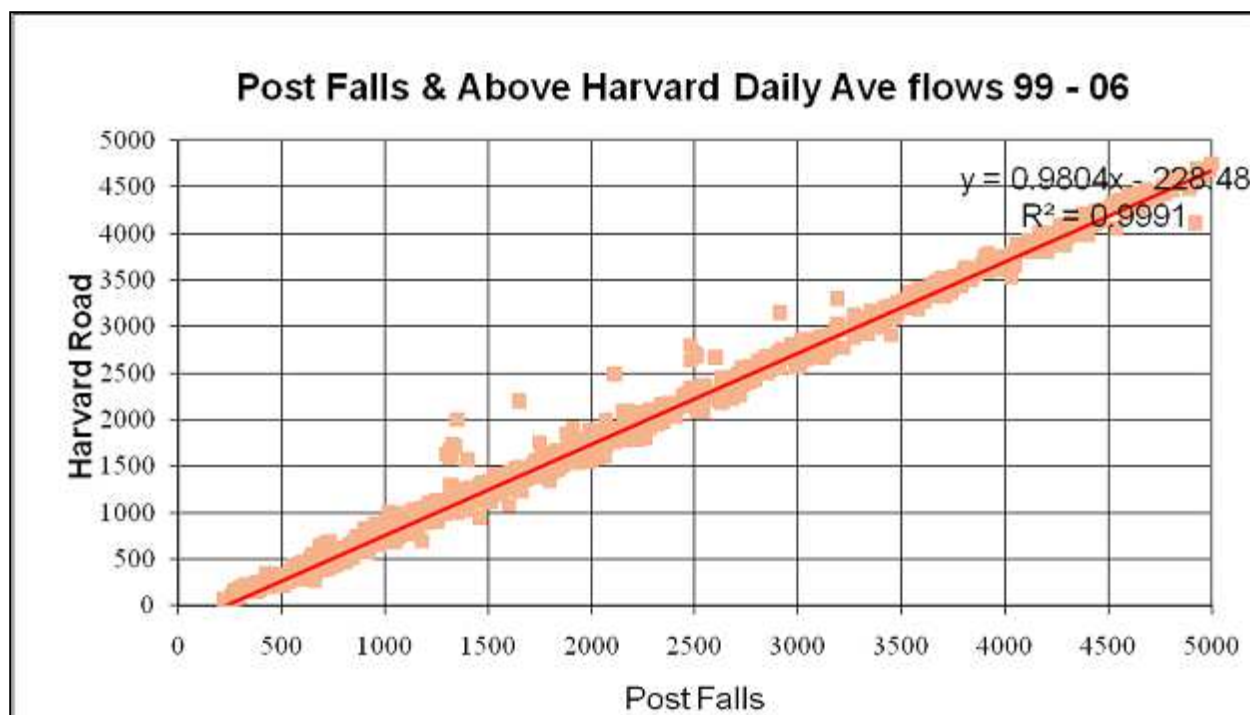
While the PCB TMDL has been delayed, clean up efforts are in progress and this proposed permit includes monitoring of toxics including PCBs and development of cleanup plans as contaminated sites are identified. EPA rules (40 CFR Subpart K (44 FR 32954-5)) do provide for the use of narrative limitations (BMPs) rather than numeric effluent limitations.

The Spokane River also regularly violates water quality criteria for Zinc. Criteria for Lead and Cadmium are also frequently exceeded, especially at higher flows. In 1999, the Spokane River Metals TMDL was completed to address these water quality exceedences (Ecology, 1999). Specific WLAs applicable to the Permittee are discussed in the section below.

CONSIDERATION OF SURFACE WATER QUALITY-BASED LIMITS FOR NUMERIC CRITERIA

Pollutant concentrations in the proposed discharge exceed water quality criteria with technology-based controls which the Department has determined to be AKART. A mixing zone is authorized in accordance with the geometric configuration, flow restriction, and other restrictions for mixing zones in Chapter 173-201A WAC and are defined as follows:

The dilution factors of effluent to receiving water that occur within these zones have been determined at the critical condition for aquatic life and human health. The acute and chronic factors for aquatic life were determined based on a critical river low flow (7Q10 flow) of 262 cfs. The critical river low flow has been impacted by relicensing of the Post Falls Dam and the efforts to maintain a minimum low flow of 500 cfs at the Post Falls Dam. Gauge data at Post Falls was reviewed and Harvard Road to forecast flow at Harvard Road based on a flow of 500 cfs at Post Falls.



Effluent flow values used to determine dilution factors were the design maximum monthly average and daily maximum flow values for the treatment facility shown in Table 2. This is somewhat of a departure from the guidance given in the Permit Writer's Manual where the maximum effluent values during the past three years are recommended to be used. The use of the design values is based on wastewater flow projections given in the latest facility plan (Century West, 2001).

Aquatic Life

Chronic: 25% of 262 cfs; effluent flow of 2.32 cfs (1.5 MGD); dilution factor = 26.35
Acute: 2.5% of 262 cfs; effluent flow of 3.87 cfs (2.5 MGD); dilution factor = 2.69

Human Health - carcinogens

Chronic: 25% of 2004 cfs; effluent flow of 2.32 cfs (1.5.MGD); dilution factor = 216

Human Health – noncarcinogens

Chronic: 25% of 367cfs; effluent flow of 2.32 cfs; dilution factor = 36.5

	Acute	Chronic
Aquatic Life	2.69	26.35
Human Health, Carcinogen	-	216
Human Health, Non-carcinogen	-	36.5

Pollutants in an effluent may affect the aquatic environment near the point of discharge (near field) or at a considerable distance from the point of discharge (far field). Toxic pollutants, for example, are near-field pollutants; their adverse effects diminish rapidly with mixing in the receiving water. Conversely, a pollutant such as BOD is a far-field pollutant whose adverse effect occurs away from the discharge even after dilution has occurred. Thus, the method of calculating water quality-based effluent limits varies with the point at which the pollutant has its maximum effect.

The derivation of water quality-based limits also takes into account the variability of the pollutant concentrations in both the effluent and the receiving water.

The critical condition for the Spokane River is the seven day average low river flow with a recurrence interval of ten years (7Q10). Ambient data at critical conditions in the vicinity of the Liberty Lake Sewer District outfall was taken from Ecology's ambient river monitoring station at the State Line (station number 57A150) for the data period 12/90 – 7/02. The ambient Spokane River background data used for the DO TMDL and critical portions of this permit are:

Parameter	Value used
7Q10 low flow	262 cfs
Temperature – winter	2.3 to 8.1 deg. C
Temperature - summer	7.6 to 22.8 deg. C
pH	7.57 s.u. (mean)
Dissolved Oxygen	10.5 mg/L (mean)
Ammonia-N	0.013 mg/L (mean)
Fecals	4.1 / 100 mL (geometric mean)
Alkalinity	18.8 mg/L (mean)
Hardness	23.9 mg/L (mean)

BOD₅, Ammonia, and Total Phosphorus - The Spokane River and Lake Spokane (Long Lake) dissolved oxygen TMDL report sets WLAs for total phosphorus, CBOD₅, and ammonia for each NPDES discharger to the Spokane River. The managed implementation plan describes the approach Ecology will take to meet these WLAs and ultimately achieve the water quality standard for dissolved oxygen in Lake Spokane.

While, this approach is spread over a twenty year managed implementation plan (MIP), the focus is on the first ten years of the MIP. In the first ten years, the focus is on phosphorus reduction to the Spokane River. These reductions will be accomplished by a combination of phosphorus treatment technology and other offset creation and management efforts.

At the LLSWD wastewater treatment plant (WWTP), technology to reduce ammonia concentrations is already in place and the LLSWD WWTP is already complying with the ammonia limits. The technology to reduce phosphorus will also reduce CBOD.

Before the end of the first ten years of the MIP, a thorough assessment will provide any necessary information to guide actions for the second ten year period.

These second permit period actions will include continuation of successful measures conducted in the first 10 years, such as operation of the phosphorus treatment technology and other permanent phosphorous reduction efforts. They may also include new actions such as additional treatment technologies, consideration of river oxygenation, and/or reconsideration of Water Quality Standards applied to the River and Lake Spokane. If new information from the “Ten Year Assessment” justifies relaxing the WLAs and the WQBELs, the WQBELs will be relaxed. If so, the following section in federal regulation regarding “anti-backsliding” is applicable:

122.44(l) Reissued permits.

(1) Except as provided in paragraph (1)(2) of this section when a permit is renewed or reissued, interim effluent limitations, standards or conditions must be at least as stringent as the final effluent limitations, standards, or conditions in the previous permit (unless the circumstances on which the previous permit was based have materially and substantially changed since the time the permit was issued and would constitute cause for permit modification or revocation and reissuance under Sec. 122.62.)

(2) In the case of effluent limitations established on the basis of Section 402(a)(1)(B) of the CWA, a permit may not be renewed, reissued, or modified on the basis of effluent guidelines promulgated under section 304(b) subsequent to the original issuance of such permit, to contain effluent limitations which are less stringent than the comparable effluent limitations in the previous permit.

(i) Exceptions--A permit with respect to which paragraph (1)(2) of this section applies may be renewed, reissued, or modified to contain a less stringent effluent limitation applicable to a pollutant, if--

Information is available which was not available at the time of permit issuance (other than revised regulations, guidance, or test methods) and which would have justified the application of a less stringent effluent limitation at the time of permit issuance; or

Ecology will establish WLAs and WQBELs on the best scientific information and interpretation available based on the facts that the “Ten Year Assessment” produces. Ecology will also examine and revise as needed the implementation of water quality based effluent limitations in terms of long term average versus monthly averages or maximums.

For the following 3 parameters (CBOD₅, TP and Ammonia) federal rules direct that effluent limitations normally be expressed in terms of monthly and weekly averages and sometimes daily maximums for a toxicant. 40 CFR 122.45(d) does allow that if the normal monthly averages, weekly averages and daily maximum are impractical, alternatives such as an annual or seasonal limit may be appropriate. For the Spokane River and Spokane Lake system impractical means the water body does not respond in a measurable way to short term variations and long term trends and measurements descriptive of long term trends such as seasonal averages and total are appropriate. For the municipal dischargers to the Spokane River and Spokane Lake system impractical also means that reliable data sets with log normal distributions for conversion of maximums to averages do not exist. In the Chesapeake Bay, EPA recognized that temperature affecting plant performance resulting in a skewed data set making it impracticable to establish monthly and weekly averages.

A skewed data set can also result when the low end of the data set is determined by the detection limit. Both reasons are currently present concluding that it is currently impracticable to establish monthly and weekly effluent limitations for all 3 parameters.

For the LLSWD the DO TMDL gives the following wasteload allocations.

Total Phosphorus - The DO TMDL uses a flow of 1.5 MGD for the year 2027 to calculate the mass of the final water quality based effluent limitations (WQBELs) and WLAs. In the Spokane River and Lake Spokane Dissolved Oxygen Total Maximum Daily Load – Water Quality Improvement Report, Table 3 gives the model input parameters. Table 5 gives the resulting Waste Load Allocations (WLAs) based on modeling scenario #1. The U.S. EPA model needed to express its input in average monthly lbs/day. Based on assumptions including weekly sampling, a seasonal average of 36 ug/L was used for model inputs from the LLSWD WWTP. While many question the validity of the coefficients used in this translation, particularly when effluent data sets are heavily influenced by significant quantities of data at the detection limit, it will take time to collect data from as yet un-built treatment facilities to derive a reliable statistical basis for better and fairer effluent limitations. Even so, there are no assurances that a log normal distribution will be present for all parameters of interest.

In the DO TMDL, WLAs are set based on a seasonal average effluent concentration. For the Liberty Lake Sewer and Water District POTW, the equivalent mass used for the WLA, at a flow of 1.51 MGD with an effluent concentration of 36 ug/l is 0.45 lbs/day. For the season, March 1 to October 31, the mass is 111 lbs. If the POTW is operating at 50 ug/L or a mass of 0.63 lbs/day a difference of 43 lbs must be found and eliminated over the course of the season. The potential offset is 43 lbs for the season.

In the interim, the effluent limitation for total phosphorus (TP) is a performance based limit. TP results for discharge season were examined for 2008 and 2009 to generate a performance limit. The performance based concentration is expressed as a mass effluent limitations in S1.B using a flow of 1.41 MGD. 1.41 MGD was the flow projected for 2017 in the collaboration sessions for the creating the “Foundational Concepts.” The flow projection has been carried forward into the current In the Spokane River and Lake Spokane Dissolved Oxygen TMDL.

The Department and the Spokane River dischargers have funded a study to determine if all the total phosphorus in the wastewater effluent is biologically available for growth of aquatic organisms. The DO TMDL assumes 100% of the TP is available for growth. Preliminary results of the bio-available study indicate the fraction of TP available for growth is less than 1.

The Water Environment Research Foundation and CH2M-Hill have published studies indicating that in wastewater the digestion step of the total phosphorus analysis introduces compounds that interfere with a reliable, reproducible analytical result. Successful compliance monitoring requires reliable, reproducible results. A surrogate for the total phosphorus analysis appears to be desirable. Wastewater experts (The City of Spokane’s Next Level of Treatment Peer Review Group) have suggested that the analysis for total reactive phosphorus is such an analysis. The Permittee will be required to submit a report establishing a ratio of total phosphorus to total reactive phosphorus and a ratio of total reactive phosphorus to bio-available phosphorus.

CBOD₅ - For the Liberty Lake Sewer and Water District POTW, the DO TMDL projects that compliance requires the effluent CBOD₅ concentration be less than 3.6 mg/L or 45 lbs/day over the season. For the season 45 lbs per day means 11,034 lbs. For the winter season of November 1 through February performance based effluent limits would be appropriate. Currently no data exists for the potential combination of treatment technologies. The proposed permit “final” effluent limitations for CBOD₅ and TSS used data from the existing discharge monitoring reports for an approximation and place holder. The BOD₅ data from current LLSWD WWTP discharge is characterized by an average weekly concentration of 3.3 mg/L; and an average monthly concentration of 2.6 mg/L. The data ranges from 1.0 mg/L to 4.8 mg/L. The common method detection limit is 2.0 mg/L and data below the MDL is of a lower accuracy. This data results in a skewed data set, not a log normal distribution.

Ammonia - With the recent upgrade there is no longer a reasonable potential for ammonia to pollute based on toxicity and the results of the first several months of operation. However, ammonia does have an oxygen demand and the DO TMDL has a waste load allocation for ammonia. For the LLSWD the revised DO TMDL gives the following effluent concentrations for ammonia:

For the season of March 1 to May 30, the allowable average concentration is 0.71 mg/L with an allowable average mass of NH₄ as N is 8.94 lbs/day and 823 lbs for the “season.”
For the season of June 1 to September 30, the allowable average concentration is 0.18 mg/L with an allowable average mass of NH₄ as N is 2.27 lbs/day and 277 lbs for the “season.”

For the season of October 1 to October 31, the allowable average concentration is 0.71 mg/L with an allowable average mass of NH₄ as N is 8.94 lbs/day and 277 lbs for the “season.”

Existing ammonia data from LLSWD WWTP for the summer months is frequently reported as less than the method detection limit resulting in a skewed data set.

Temperature and pH - The impact of the discharge on the temperature and pH of the receiving water was modeled by simple mixing analysis at critical condition based on EPA procedures (EPA, 1988). The receiving water ambient conditions at the critical conditions that were used are shown above.

This was followed up with effluent temperature monitoring through 2006. Under critical conditions there is no predicted violation of the Water Quality Standards for Surface Waters and the effluent may modestly cool the receiving water. This is a losing stretch of the Spokane River and ground water provides no cooling. In July, August and September the river water temperature does exceed the standard.

The technology-based effluent limitations for pH that are defined in rule were placed in the permit and temperature was not limited. However temperature in the river will be monitored as one set of data is not necessarily representative of a dynamic system.

Occasionally the pH of the river at stateline exceeds 7.8 and can be up to 8.18 in August. Additionally, alkalinity in the river is low, 16 to 22 mg/L as CaCO₃. Information on alkalinity of the river at state line and Barker Rd. is limited to 2008. Low alkalinity, higher pH and low flows mean that there is the potential the pH of the river potentially could change more than the 0.5 pH unit at the edge of the chronic mixing zone due to the minimum pH of the treatment plant effluent. The minimum pH at the LLSWD WWTP generally occurs in the afternoon and is temporary. Current monitoring does not indicate how temporary. The water quality standards do not address duration of a pH change of 0.5 pH units.

The permit proposes to require continuous pH measurement of the effluent or no less frequently than 15 minute intervals. The permit proposes to require grab sample monitoring of river alkalinity once a month in July, August and September.

Fecal Coliform - The numbers of fecal coliform were modeled by simple mixing analysis using the technology-based limit of 400 organisms per 100 mL and a dilution factor of 26.35.

Under critical conditions there is no predicted violation of the Water Quality Standards for Surface Waters with the technology-based limit. Therefore, the technology-based effluent limitation for fecal coliform bacteria was placed in the proposed permit.

Toxic Pollutants - Federal regulations (40 CFR 122.44) require NPDES permits to contain effluent limits for toxic chemicals in an effluent whenever there is a reasonable potential for those chemicals to exceed the surface water quality criteria. This process occurs concurrently with the derivation of technology-based effluent limits. Facilities with technology-based effluent limits defined in regulation are not exempted from meeting the Water Quality Standards for Surface Waters or from having surface water quality-based effluent limits.

The following toxics were determined to be present in the discharge: Cadmium, Lead, Zinc, and Ammonia. A reasonable potential analysis was conducted for Ammonia to determine whether or not effluent limitations would be required in this permit.

The Spokane River is also listed for violating criteria for total Polychlorinated Biphenyls (PCBs). Lake Spokane is listed for violating water quality standards for 2,3,7,8 TCDDs; also known as Dioxins and Furans. A separate TMDL for these pollutants was started. It will be published as a technical report to guide source control and cleanup activities. Monitoring of the POTW effluent for these pollutants is appropriate. Ambient monitoring also indicates the presence of Polybrominated Diphenyl Ethers (PBDE). As an initial step toward future source identification the wastewater effluent will be monitored for PBDE.

Heavy Metals - Spokane River's water quality for Cadmium, Lead, and Zinc has violated the surface water criteria for these metals, especially at higher flows. High metals concentrations are from past mining activities along the north and south forks of the Coeur d'Alene River which discharge into Lake Coeur d'Alene. A study was completed and final report submitted to EPA (Ecology, 1998; 1999) with recommended procedures for calculating permit limitations for Cadmium, Lead, and Zinc that are protective of aquatic life.

Limits will be determined using procedures in Ecology's 1999 Spokane River Dissolved Metals TMDL. The limitation will be the more restrictive of either:

- Potential limits based on meeting aquatic life criteria using effluent hardness at end-of-pipe, or
- Potential limits, performance plus 10%, based on maintaining existing concentrations of metals in effluent, where adequate data exist (i.e., performance-based limits).

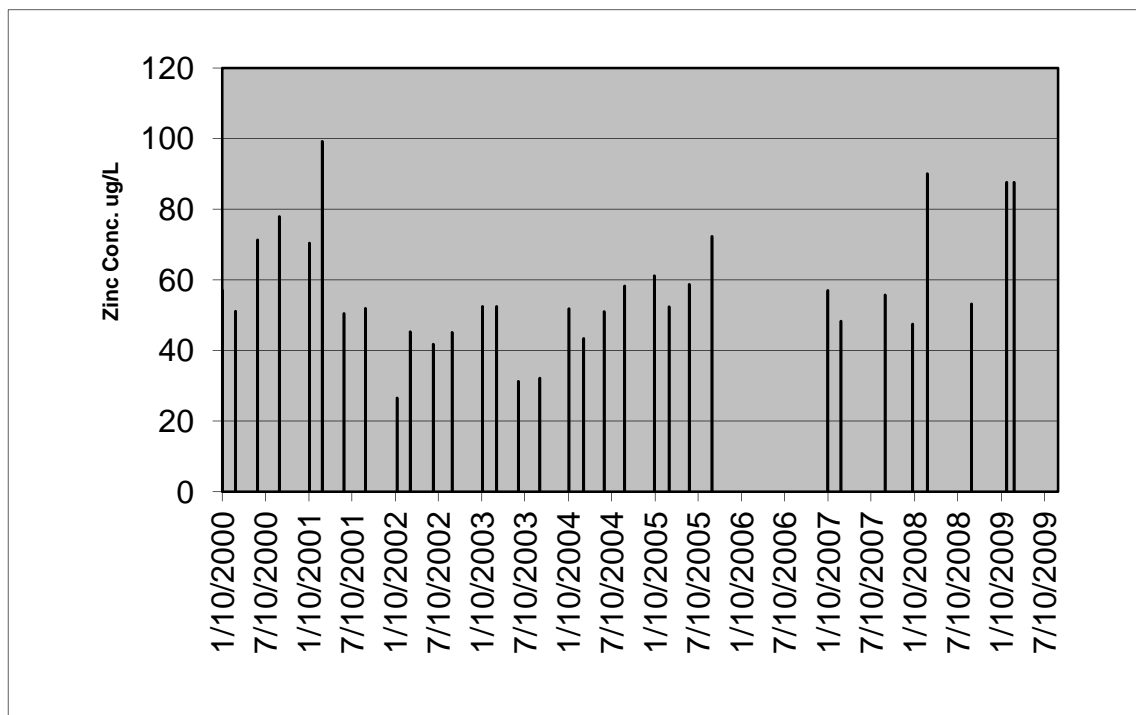
Water quality-based effluent limitations for Cadmium, Lead, and Zinc are usually based on blended effluent hardness and river hardness calculated at the edge of the respective mixing zone boundary as used in the EPA Technical Support document. Ecology's TSD calc spreadsheet follows the EPA procedure. However, the Spokane River Dissolved Metals TMDL for Cadmium, Lead, and Zinc used effluent hardness, no blending.

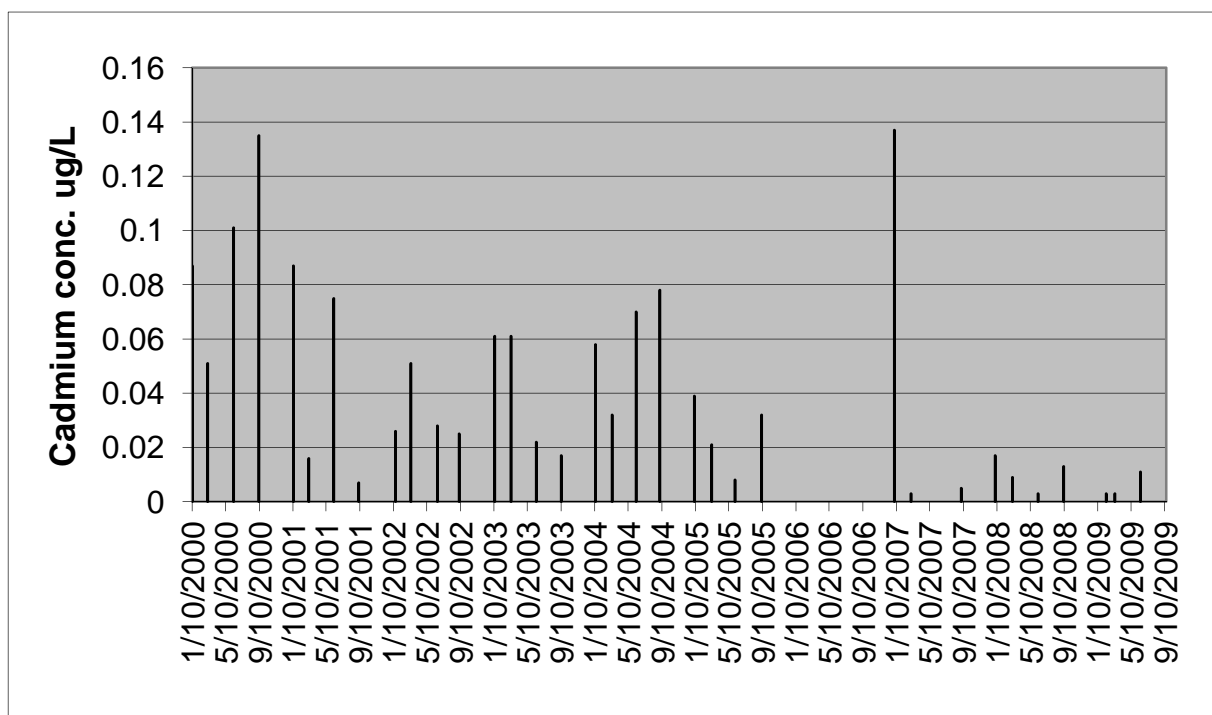
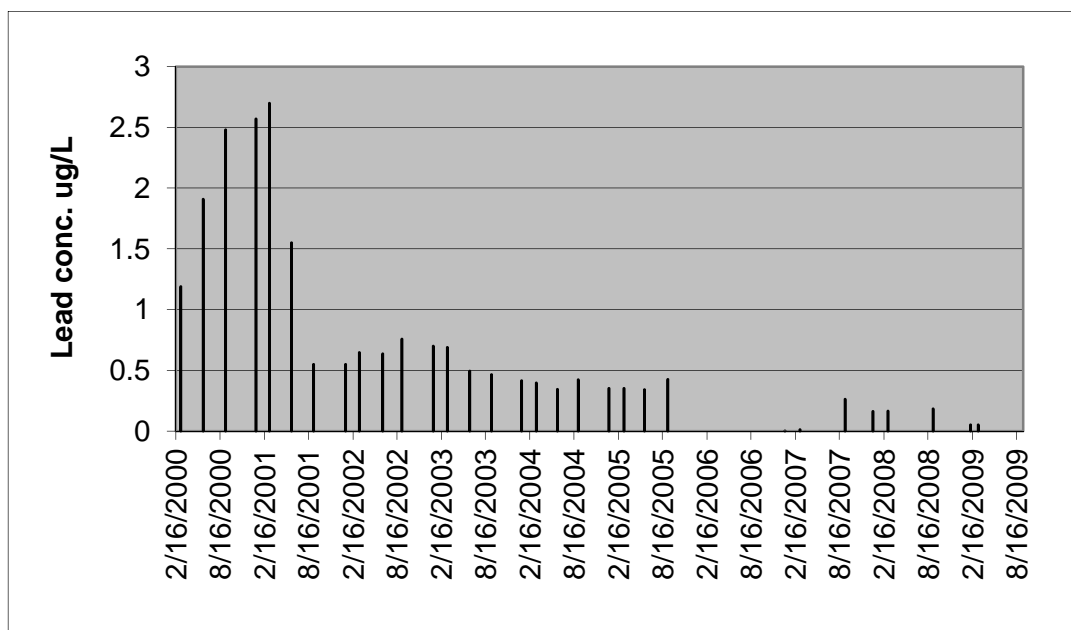
Cadmium, Lead, and Zinc:

In accordance with the metals TMDL for the Spokane River, the WLA-based limit for each metal is the more stringent of the two methods (WQ-based vs. Performance-based) and are as follows. The data for cadmium indicates that there is not a reasonable potential to pollute. The cadmium effluent limitation therefore will be performance based. There is a reasonable potential for lead to pollute.

For zinc there is a reasonable potential, however, the ambient concentration in the river exceeds the chronic water quality standard and the river has no dilution capacity. The dilution factor for the chronic condition is 1.

For zinc, effluent monitoring shows some increase of effluent concentration in 2003 through 2008 over 2001 and 2002.





Based on the procedure from the Spokane River Dissolved Metals TMDL, the current water quality standards and hardness data from LLSWD, the effluent limits are the following:

	Average Monthly Limit	Maximum Daily
Zinc (total recoverable)	80.8 ug/L	117.8 ug/L
Lead (total recoverable)	3.7 ug/L	5.4 ug/L

Note: the metal translators for dissolved/total fraction have been revised.

Based on the procedure from the Spokane River Metals TMDL, the performance based effluent limitations for cadmium are the following:

	Average Monthly Limit	Maximum Daily
Cadmium (total recoverable)	76 ug/L	396 ug/L

Other metals:

The current permit required a priority pollutant scan of the effluent. Metals data from this analysis were submitted with the permit application with the following results:

	Result
Copper	0.013 mg/L

A determination of the reasonable potential for these metals to exceed the water quality criteria was evaluated with the procedures given in EPA (1991) and described in Ecology's Permit Writer's Manual at the critical condition. The translator value for copper (0.996) was determined from the hardness metals ambient data for the Spokane River at the state line, 57A150, monitoring station (October 1998 – August 2008). It was determined that there is a no reasonable potential for the effluent to cause a violation of the copper surface water criteria.

WHOLE EFFLUENT TOXICITY

The Water Quality Standards for Surface Waters require that the effluent not cause toxic effects in the receiving waters. Many toxic pollutants cannot be detected by commonly available detection methods. However, toxicity can be measured directly by exposing living organisms to the wastewater in laboratory tests and measuring the response of the organisms. Toxicity tests measure the aggregate toxicity of the whole effluent, and therefore this approach is called whole effluent toxicity (WET) testing. Some WET tests measure acute toxicity and other WET tests measure chronic toxicity.

Acute toxicity tests measure mortality as the significant response to the toxicity of the effluent. Dischargers who monitor their wastewater with acute toxicity tests are providing an indication of the potential lethal effect of the effluent to organisms in the receiving environment.

Chronic toxicity tests measure various sublethal toxic responses such as retarded growth or reduced reproduction. Chronic toxicity tests often involve either a complete life cycle test of an organism with an extremely short life cycle or a partial life cycle test on a critical stage of one of a test organism's life cycles. Organism survival is also measured in some chronic toxicity tests.

For the previous permit cycle whole effluent toxicity testing was done on a composite effluent sample collected in July 1999 as required by the discharge permit. The results of the testing are:

Test	Species	NOEC	LOEC	LC ₅₀	IC ₂₅
48hr Acute survival	<i>Daphnia pulex</i>	100%	100%	NA	NA
96hr Acute survival	fathead minnow	36%	50%	52.5%	NA
7 day Chronic survival	<i>Ceriodaphnia dubia</i>	50%	100%	71.4%	NA
7 day Chronic reproduction	<i>Ceriodaphnia dubia</i>	12.5%	36%	NA	22.8%
7 day Chronic survival	fathead minnow	36%	50%	84.8%	NA
7 day Chronic growth	fathead minnow	12.5%	36%	NA	38%
NOEC = no observable effects concentration LOEC = lowest observable effects concentration LC ₅₀ = lethal concentration where 50% of the organisms are affected IC ₂₅ = inhibitory concentration where 25% of the population are affected					

At that time there was no survival (0 %) of the fathead minnow in 100% effluent for the 96hr acute toxicity test. An Ecology review of the test results using TOXIS software concluded that an acute WET limit is needed. The review also noted that the effluent showed some chronic toxicity.

The new wastewater treatment is producing very good effluent in terms of nitrogen. To verify the lack of other toxicants in toxic amounts, the Permittee will be required to characterize the effluent with regards to whole effluent toxicity. This will be done twice during the permit cycle, 2011 and 2013.

Accredited WET testing laboratories have the proper WET testing protocols, data requirements, and reporting format. Accredited laboratories are knowledgeable about WET testing and capable of calculating an NOEC, LC₅₀, EC₅₀, IC₂₅, etc. All accredited labs have been provided the most recent version of the Department of Ecology Publication # WQ-R-95-80, *Laboratory Guidance and Whole Effluent Toxicity Test Review Criteria* which is referenced in the permit. Any Permittee interested in receiving a copy of this publication may call the Ecology Publications Distribution Center 360-407-7472 for a copy. Ecology recommends that the Permittee send a copy of the effluent limitations and acute or chronic toxicity sections(s) of their permit to their laboratory of choice.

When the WET tests during effluent characterization indicate that no reasonable potential exists to cause receiving water toxicity, the Permittee will not be given WET limits and will only be required to retest the effluent prior to application for permit renewal in order to demonstrate that toxicity has not increased in the effluent.

If the Permittee makes process or material changes which, in the Department's opinion, results in an increased potential for effluent toxicity, then the Department may require additional effluent characterization in a regulatory order, by permit modification, or in the permit renewal.

Toxicity is assumed to have increased if WET testing conducted for submission with a permit application fails to meet the performance standards in WAC 173-205-020, "whole effluent toxicity performance standard". The Permittee may demonstrate to the Department that changes have not increased effluent toxicity by performing additional WET testing after the time the process or material changes have been made.

HUMAN HEALTH

Washington's water quality standards now include 91 numeric health-based criteria that must be considered in NPDES permits. These criteria were promulgated for the state by the U.S. EPA in its National Toxics Rule (Federal Register, Volume 57, No. 246, Tuesday, December 22, 1992).

Based on the priority pollutant scan submitted with the permit application and the reasonable potential analysis spreadsheet, the effluent from the Liberty Lake WWTP is not likely to have chemicals of concern for human health. The determination was evaluated with procedures given in the Technical Support Document for Water Quality-Based Toxics Control (EPA/505/2-90-001) and the Department's Permit Writer's Manual (Ecology Publication 92-109, 2002 revision).

SEDIMENT QUALITY

The Department has promulgated aquatic sediment standards (Chapter 173-204 WAC) to protect aquatic biota and human health. These standards state that the Department may require permittees to evaluate the potential for the discharge to cause a violation of applicable standards (WAC 173-204-400).

Section 173-204-400 provides guidance to evaluate the potential for sediment impacts. Local conditions are a key consideration. With the level of treatment provided by the recently upgraded facility and the scouring effect of the Spokane River, it is unlikely that the discharge from the facility is causing any environmental concerns with the sediments downstream of the outfall.

H. GROUND WATER QUALITY LIMITATIONS (HYDROGEOLOGIC STUDY)

The Department has promulgated Ground Water Quality Standards (Chapter 173-200 WAC) to protect uses of ground water. Permits issued by the Department shall be conditioned in such a manner so as not to allow violations of those standards (WAC 173-200-100).

Information presented in the permit application and annual reports show that final effluent is used for landscape irrigation within the confines of the facility site. The annual report for 2001 showed a total of 8.17 million gallons was spray irrigated.

The protection of the ground water at the site as well as the entire Spokane River valley from Spokane to Coeur D'Alene is very important since the aquifer supplies almost all of the drinking water for the 400,000 residents. The Spokane Valley/Rathdrum Prairie aquifer has been designated sole source aquifer status by the EPA. The depth of the aquifer can be as shallow as 40 ft at the eastern Spokane city limits.

Information presented to Ecology by the Permittee during the development of this Fact Sheet indicates the desire to continue spray irrigation of final effluent onto grounds within the confines of the treatment facility site during the irrigation season.

The state's ground water standards (WAC 173-200) apply to any activity that has a potential to contaminate ground water quality. Given the volume of water irrigated and the shallow nature of the aquifer, the irrigation of effluent on the treatment facility site has potential to impact ground water. To determine the potential impacts of the irrigation and other reuse options, a hydrogeologic study of the site is necessary. The study will describe the geologic and hydrogeologic characteristics of the site and vicinity and establish background concentrations for nitrates and other contaminants of interest.

The permit will require the submittal of a hydrogeologic study. It shall comply with all of the requirements listed in Ecology's ground water guidance (Ecology, 1996). The study must also describe how any proposed irrigation practice or other reuse option will comply with any disinfection and/or setback requirements contained in Washington Department of Health's guidance, "*Design Criteria for Municipal Wastewater Land Treatment Systems for Public Health Protection*" or "*Water Reclamation and Reuse Standards*."

I. MIXING ZONE

The current permit exempts the mixing zone from the dimensional boundaries described in the surface water standards (WAC 173-201A-400(12)) because the outfall was constructed prior to 1986. However, with the improved effluent quality of the wastewater treatment facility, the exemption is not necessary. The outfall was modeled in the Engineering Report for the current upgrade which used a design flow of 2 MGD in the maximum month.

The permit will allow a mixing zone with dimensional boundaries as provided in WAC 173-201A-400(7).

Comparison of Effluent Limits with the Existing Permit Issued August 31, 1998

Parameter	Existing Limits	Initial Interim Limits	Final Limits
Flow	1 MGD	1 MGD	2 MGD ⁽¹⁾
BOD ₅ monthly average average weekly	30 mg/L (200 lbs/day) 45 mg/L (300 lbs/day)	10 mg/L (83 lbs/day) 15 mg/L (125 lbs/day)	
CBOD ₅ monthly average			45.0 lbs/day
TSS monthly average average weekly	30 mg/L (250 lbs/day) 45 mg/L (375 lbs/day)	10 mg/L (83 lbs/day) 15 mg/L (125 lbs/day)	5 mg/L (83.4 lbs/day) 7 mg/L (116.8 lbs/day)
pH daily minimum daily maximum	6 s.u. 9 s.u.	7 s.u. 8.5 s.u.	7 s.u. 8.5 s.u.
Fecal Coliforms			

monthly average weekly average	200 cfu/ 100 mL 400 cfu/ 100 mL	200 cfu/ 100 mL 400 cfu/ 100 mL	200 cfu/ 100 mL 400 cfu/ 100 mL
Total Phosphorus	not less than 85% removal when flow = 0.895 MGD, or required by Spokane River Phosphorus Mgmt. Plan	0.612 mg/L	0.45 lbs/day - monthly average
Ammonia (NH ₄ as N)	March 1 to May 30, an average monthly of 8.94 lbs/day June 1 to September 30, an average monthly of 2.27 lbs/day October 1 to October 31, an average monthly of 8.94 lbs/day		
Zinc (total recoverable) daily maximum		117.8 ug/L	117.8 ug/L
Lead (total recoverable) daily maximum		5.4 ug/L	5.4 ug/L
Cadmium (total recoverable) daily maximum		396 ug/L	396 ug/L
⁽¹⁾ The Liberty Lake Sewer District WWTP will be permitted for a 2 MGD hydraulic capacity and associated influent loadings upon submission and Department approval of the engineering report demonstrating how the District intends to implement the requirements of the Spokane River Dissolved Oxygen TMDL, and the managed implementation plan.			

J. IMPLEMENTATION OF THE MANAGED IMPLEMENTATION PLAN

The collaborative effort that led to the development of the current managed implementation plan contains the following agreed actions which are pertinent to the proposed permit.

The agreed actions are:

- **Technology Selection Protocol:** The Liberty Lake Sewer and Water District will prepare, and submit to Ecology for approval, a comprehensive technology selection protocol for choosing the most effective feasible technology for seasonally removing phosphorus from their effluent with an objective of achieving a discharge with seasonal average 50µg/l phosphorus or lower. Pilot testing is a significant part of the protocol and has appropriate provisions for oversight, quality assurance and control. The protocol includes a preliminary schedule for construction of the treatment technology.

• **Offset Plan:** Not a requirement in the proposed permit. In the next permit cycle it is anticipated that an Offset Plan will be required. The future offset plan is anticipated to address a schedule for offset creation and trading, other phosphorus removal actions such as conservation, effluent re-use, source control through support of regional phosphorus reduction efforts (such as limiting use of fertilizers and dishwasher detergents), and supporting regional non-point source control efforts to be established. The offset plan, in combination with the phosphorus reduction from technology, will provide reasonable assurance of meeting the Liberty Lake Sewer and Water District's final effluent limitations given in S.1.C. Subsequent updates will include an annual assessment of the previous year's offset creation and management effort, an accounting of offset credits earned, expended and available for trading. Based on lessons learned from ongoing studies and evaluations of previously implemented best management practices, the report shall make recommendations for the upcoming year.

• **Engineering Report:** After the Liberty Lake Sewer and Water District concludes the technology selection protocol, the Permittee will prepare, and submit to Ecology for approval, an Engineering Report concerning the chosen technology, including any updates to the construction schedule. The Engineering Report will (if necessary) be accompanied by amendments to the schedule and substance of the target pursuit actions so that in combination with the Engineering Report on expected technology performance, there is reasonable assurance of meeting the target in ten years. As the DO TMDL was being finalized a question was raised regarding the equivalency of CBOD₅, Total Phosphorus and Ammonia to one another for purposes of offset or pollutant credit trading within a permit or between permittees. The modeling done to date for the DO TMDL does not provide an answer. The engineering report will be the document where pollutant equivalencies are presented for the Department review and documented.

The Engineering Report is to address the following topics based on rule requirements, pollutant equivalency consideration, potential for offset trading, etc:

- 1) Population projections by year for the next 20 years,
- 2) Loading projections, flow, TP, CBOD, Ammonia, and TN;
- 3) Wastewater treatment processes needed to reliably comply with the CBOD₅, NH₃ and TP WLAs of the Spokane River and Lake Spokane Dissolved Oxygen TMDL; including loadings potentially bypassed in a "blending event," and requiring an offset or pollutant equivalency consideration;
- 4) Projection of loading removed for TP, CBOD, Ammonia, and TN;
- 5) Projection of offset(s) and other actions needed for compliance with DO TMDL that reduce TP, CBOD and ammonia loadings to the final effluent and the river,
- 6) Options considered to generate offset(s),
- 7) Recommended offset option and/or other actions (such as water reclamation and offset generating options if projected to be needed)
- 8) Timeline of offsets and other DO compliance actions to be needed and implementation schedule to achieve DO TMDL compliance,

- 9) Site options and process options for future addition of process elements and offset generating activities to achieve the final equivalent effluent limitations and water reclamation requirements as described in Chapter 173-219 WAC “Reclaimed Water Use.”
- 10) Establish a ratio of total phosphorus (TP) to total reactive phosphorus (TRP) and a ratio of total reactive phosphorus (TRP) to bio-available phosphorus.
- 11) Findings from the University of Washington / WERF bioavailability lab study.
- 12) Subsequent monitoring and modeling of bioavailable phosphorus impacts in Lake Spokane.
- 13) the pounds of phosphorus that are not bio-available, not reactive and not a nutrient source that contribute to the total phosphorus waste load allocation
- 14) recommended adjustment potentially made to the effluent limitations needed for compliance with the DO TMDL because of non bio-available phosphorus in the effluent,
- 15) The plan update, in combination with the pollutant reduction from technology, shall provide reasonable assurance of meeting the Permittee’s Waste Load Allocations in ten (10) years.

• **Interim Limits:** This portion of the original Foundational Concepts has been superseded by the new DO TMDL.

• **Final Limits:** Final limits applicable during the remaining term of the MIP will be set based on the actual performance of the technology installed and operated at optimum reliable efficiency. The effectiveness of the TMDL and the permit limits will be evaluated at the 10 year assessment discussed in the managed implementation plan. If necessary and appropriate, new WQBELs may be established based on the result of the 10 year assessment.

The Clean Water Act generally prohibits relaxing effluent limits in reissued permits. However, exceptions are provided for in the anti-backsliding rule provisions. For example, new information, which would have justified less stringent effluent limits had it been available, can be used to justify relaxing effluent limits in reissued permits (see section 402(o)(2) of the Act). If the revised WQBELs are less stringent based on such new information, this anti-backsliding exception would apply.

Start Up: The compliance schedule anticipates a period of time for an operational shake down period to establish consistent reliable performance (possibly two years) and allows a couple years of data collection prior to the ten year assessment. The permit will have a compliance schedule to implement planning, design and construction of phosphorus removal process elements. The schedule assumes biennial assessment data collection beginning in even numbered years and concluding in odd numbered years. The final two year cycle would be 2018 and 2019 leading into the critical Ten Year Assessment.

Similarly, the permit compliance schedule requires submission of updates to the offset plan including an annual assessment of progress and lessons learned.

K. COMPLIANCE SCHEDULE

The proposed DO TMDL and the subsequent managed implementation plan are anticipated to require additional treatment facilities to remove phosphorus and oxygen consuming pollutants. The Liberty Lake Sewer and Water District will produce the following deliverables on or before the date given:

Item	Date
Engineering Report (update) submitted	October 30, 2013
Submission of Contract Documents for construction of phosphorus removal process units to achieve interim TP effluent limitations	October 1, 2014
Verification of Construction and Start Up Completion ready for Compliance with Spokane River and Lake Spokane DO TMDL WLAs	March 1, 2018

The Offset Plan described in the Managed Implementation Plan is intended to 1) keep the Department and the public informed of the progress being made with offset management and 2) to form the basis and framework for offset credit trading. The contents of the plan will include an annual assessment of the previous year's offset management effort, an accounting of offset credits earned, expended and available for trading. Based on lessons learned from ongoing studies and evaluations of previously implemented best management practices, the report shall make recommendations for the upcoming year. However, the Spokane River dischargers will not need offsets in the first five year permit cycle and therefore submittal of a plan for offsets and trading is not a requirement of this proposed permit's compliance schedule.

IV. MONITORING REQUIREMENTS

Monitoring, recording, and reporting are required (WAC 173-220-210 and 40 CFR 122.41) to verify that the treatment process is functioning correctly and the effluent limitations are being achieved.

Monitoring for priority pollutants is being required to further characterize the effluent and to add to the data base for the development of local discharge limits. Whole effluent toxicity testing will be required to assess chronic toxicity when the next permit is issued. Some chronic toxicity was found in the samples collected in 1999.

Monitoring of sludge quantity and quality is necessary to determine the appropriate uses of the sludge. Sludge monitoring is required by the current state and local solid waste management program and also by EPA under 40 CFR 503.

The monitoring schedule is detailed in the proposed permit under Condition S2. Specified monitoring frequencies take into account the quantity and variability of discharge, the treatment method, past compliance, significance of pollutants, and cost of monitoring.

The required monitoring frequency is consistent with agency guidance given in the 2002 version of Ecology's *Permit Writer's Manual* (July 1994) for activated sludge treatment facilities with flows less than 2 MGD.

Additional monitoring is required in order to further characterize the effluent. These monitored pollutants could have a significant impact on the quality of the surface water.

The Permittee will be required to have influent, final effluent, and sludge sampled for toxic pollutants in order to characterize the input from industrial users. Sampling is also done to determine if pollutants interfere with the treatment process or pass through the plant to the sludge or the receiving water. The monitoring data will be used by the Department or the Liberty Lake Sewer and Water District to develop local limits which commercial and industrial users must meet.

Nitrate testing of the effluent will be added because of the Permittee's proposed use of final wastewater for onsite landscape irrigation.

L. EFFLUENT LIMITS BELOW DETECTION

The water quality-based effluent limit for CBOD₅ in the wastewater is below the capability of current analytical technology to detect. The Method Detection Level (MDL) is the minimum concentration of an analyte that can be measured and reported with a 99 percent confidence that its concentration is greater than zero as determined by a specific laboratory method. For average monthly limits, all values above the MDL are used as reported and all values below the MDL are calculated as zero.

M. LAB ACCREDITATION

With the exception of certain parameters the permit requires all monitoring data to be prepared by a laboratory registered or accredited under the provisions of Chapter 173-50 WAC, *Accreditation of Environmental Laboratories*. The laboratory at this facility is accredited for general chemistries and microbiology.

Accredited Parameters:

General Chemistry		
Parameter name	Method	Matrix *
Biochemical Oxygen Demand	SM 5210 B	N
Oxygen, dissolved	SM 4500-O C	N
pH	SM 4500-H	N
Phosphorus, total	HACH 8190	N

Residue-nonfilterable (TSS)	SM 2540 D	N
Residue-volatile	EPA 160.4	N
Solids, Total Suspended	SM 2540 D	N
Microbiology		
Parameter name	Method	Matrix *
Fecal Coliforms	SM 9222 D	N
Physical		
Parameter name	Method	Matrix *
pH	SM 4500-H	N
* Matrix key: D = drinking water; N = non-potable water; S = solids/chem materials; A = air		

LLSWD contracts with commercial laboratories for other parameters not listed above. Minimum Detection Limits (MDL) studies are performed as per 40 CFR part 136. Permit appendix A lists recommended analytical protocols. Because of the significance of nutrient (phosphorus and ammonia) monitoring to the DO TMDL, the permit appendix A recommended analytical protocol for total phosphorus is the required protocol and must have a required reporting limit of at least 5 ug/L. The recommended analytical protocol for total ammonia (as N) in Appendix A is the required protocol and must have a required reporting limit of 50 ug/L.

V. OTHER PERMIT CONDITIONS

N. REPORTING AND RECORDKEEPING

The conditions of S3 are based on the authority to specify any appropriate reporting and recordkeeping requirements to prevent and control waste discharges (WAC 173-220-210).

O. PREVENTION OF FACILITY OVERLOADING

Overloading of the treatment plant is a violation of the terms and conditions of the permit. To prevent this from occurring, RCW 90.48.110 and WAC 173-220-150 require the Permittee to take the actions detailed in proposed permit requirement S.4 to plan expansions or modifications before existing capacity is reached and to report and correct conditions that could result in new or increased discharges of pollutants.

P. RECLAMATION AND REUSE

The Managed Implementation Plan envisions reclamation and reuse as being integral to the long term success of the Spokane River DO TMDL. The proposed permit will have two reuse sections.

The first permit section for Reclamation and Reuse will be for small scale pilot and demonstration project(s) to test the feasibility of a reclamation and reuse proposal.

Typically small scale pilot projects have received dual agency oversight through the engineering review and approval process with appropriate follow up and reporting of the project. That process will be kept in place for this permit.

The second permit section will be for long term implementation of successful demonstrations of reclamation and reuse pilot projects. The proposed section will include the general elements of current reclamation permit requirements developed by the Departments of Health and Ecology for other reclamation and reuse facilities. When the Permittee is ready to implement the proposal, a request will be submitted to the Departments of Health and Ecology for review and potential approval. Following approval, the permit will be reopened and modified to include appropriate monitoring schedule, water quality limitations, reliability requirements, operation and maintenance requirements and reporting.

Q. OPERATION AND MAINTENANCE (O&M) – MANUAL UPDATE

The proposed permit contains condition S5. as authorized under RCW 90.48.110, WAC 173-220-150, Chapter 173-230 WAC, and WAC 173-240-080. It is included to ensure proper operation and regular maintenance of equipment, and to ensure that adequate safeguards are taken so that constructed facilities are used to their optimum potential in terms of pollutant capture and treatment.

R. RESIDUAL SOLIDS HANDLING

To prevent water quality problems the Permittee is required in permit condition S7. to store and handle all residual solids (grit, screenings, scum, sludge, and other solid waste) in accordance with the requirements of RCW 90.48.080 and State Water Quality Standards.

The final use and disposal of biosolids from this facility is regulated by U.S. EPA under 40 CFR 503, and by Ecology under Chapter 70.95J RCW and Chapter 173-308 WAC. The disposal of other solid waste is under the jurisdiction of the Spokane County Health Department.

Waste activated sludge is dried onsite using a filter press and hauled off-site. The district's goal is to meet the federal 503 regulations for Class B biosolids, and dispose of the material at the lowest effective cost to the district and the rate payers.

S. PRETREATMENT

Federal and State Pretreatment Program Requirements

Under the terms of the addendum to the "Memorandum of Understanding between Washington Department of Ecology and the United States Environmental Protection Agency, Region 10" (1986), the Department of Ecology (Department) has been delegated authority to administer the Pretreatment Program (i.e. act as the Approval Authority for oversight of delegated Publicly Owned Treatment Works (POTWs)).

Under this delegation of authority, the Department has exercised the option of issuing wastewater discharge permits for significant industrial users discharging to POTWs which have not been delegated authority to issue wastewater discharge permits.

There are a number of functions required by the Pretreatment Program which the Department is delegating to such POTWs because they are in a better position to implement the requirements (e.g. tracking the number and general nature of industrial dischargers to the sewerage system). The requirements for a Pretreatment Program are contained in Title 40, part 403 of the Code of Federal Regulations. Under the requirements of the Pretreatment Program (40 CFR 403.8(f)(1)(iii)), the Department is required to approve, condition, or deny new discharges or a significant increase in the discharge for existing significant industrial users (SIUs) (40 CFR 403.8 (f)(1)(i)).

The Department is responsible for issuing State Waste Discharge Permits to SIUs and other industrial users of the Permittee's sewer system. Industrial dischargers must obtain these permits from the Department prior to the Permittee accepting the discharge (WAC 173-216-110(5)). (Industries discharging wastewater that is similar in character to domestic wastewater are not required to obtain a permit. Such dischargers should contact the Department to determine if a permit is required.). Industrial dischargers need to apply for a State Waste Discharge Permit sixty days prior to commencing discharge. The conditions contained in the permits will include any applicable conditions for categorical discharges, loading limitations included in contracts with the POTW, and other conditions necessary to assure compliance with State water quality standards and biosolids standards.

Wastewater Permit Required

RCW 90.48 and WAC 173-216-040 require SIUs to obtain a permit prior to discharge of industrial waste to the Permittee's sewerage system. This provision prohibits the POTW from accepting industrial wastewater from any such discharger(s) without authorization from the Department.

Requirements for Routine Identification and Reporting of Industrial Users

The NPDES permit requires non-delegated POTWs to "take continuous, routine measures to identify all existing, new, and proposed SIUs and potential significant industrial users (PSIUs) discharging to the Permittee's sewerage system." Examples of such routine measures include regular review of business tax licenses for existing businesses and review of water billing records and existing connection authorization records. System maintenance personnel can also be diligent during performance of their jobs in identifying and reporting as-yet unidentified industrial dischargers. Local newspapers, telephone directories, and word-of-mouth can also be important sources of information regarding new or existing discharges. The POTW is required to notify an industrial discharger, in writing, of their responsibilities regarding application for a State waste discharge permit and to send a copy of the written notification to the Department. The Department will then take steps to solicit a State Waste Discharge Permit application.

Requirements for Performing an Industrial User Survey

An Industrial User Survey is used to develop a list of SIUs and PSIUs, and of equal importance, to provide sufficient information about industries which discharge to the POTW, to determine which of them require issuance of State waste discharge permits or other regulatory controls. An Industrial User Survey is an important part of the regulatory process used to prevent interference with treatment processes at the POTW and to prevent the exceedance of water quality standards. The Industrial User Survey also can be used to contribute to the maintenance of sludge quality, so that sludge can be a useful biosolids product rather than an expensive waste problem. An Industrial User Survey is a rigorous method for identifying existing, new, and proposed significant industrial users and potential significant industrial users. A complete listing of methodologies is available in the Department of Ecology guidance document entitled "Conducting an Industrial User Survey".

Duty to Enforce Discharge Prohibitions

This provision prohibits the POTW from authorizing or permitting an industrial discharger to discharge certain types of waste into the sanitary sewer. The first portion of the provision prohibits acceptance of pollutants which cause pass through or interference. The definitions of pass through and interference are in Appendix B of the fact sheet.

The second portion of this provision prohibits the POTW from accepting certain specific types of wastes, namely those which are explosive, flammable, excessively acidic, basic, otherwise corrosive, or obstructive to the system. In addition wastes with excessive BOD, petroleum based oils, or which result in toxic gases, are prohibited to be discharged. The regulatory basis for these prohibitions is 40 CFR Part 403, with the exception of the pH provisions which are based on WAC 173-216-060.

The third portion of this provision prohibits certain types of discharges unless the POTW receives prior authorization from the Department. The discharges include cooling water in significant volumes, stormwater and other direct inflow sources, and wastewaters significantly affecting system hydraulic loading, which do not require treatment.

Support by the Department for Developing Partial Pretreatment Program by POTW

The Department has committed to providing technical and legal assistance to the Permittee in fulfilling these joint obligations, in particular assistance with developing an adequate sewer use ordinance, notification procedures, enforcement guidelines, and developing local limits and inspection procedures.

Local Sewer Ordinance

The permit will require the sewer and water district to review its local limits and its local sewer ordinance and submit any updates or amendments that are made. The Permittee will be required to update the local limits ordinance by March 1, 2011 and the local sewer ordinance by October 15, 2011.

T. GENERAL CONDITIONS

General Conditions are based directly on state and federal law and regulations and have been standardized for all individual municipal NPDES permits issued by the Department.

VI. PERMIT ISSUANCE PROCEDURES

U. PERMIT MODIFICATIONS

The Department may modify this permit to impose numerical limitations, if necessary to meet Water Quality Standards, Sediment Quality Standards, or Ground Water Standards, based on new information obtained from sources such as inspections, effluent monitoring, outfall studies, and effluent mixing studies.

The Department may also modify this permit as a result of new or amended state or federal regulations.

V. RECOMMENDATION FOR PERMIT ISSUANCE

This proposed permit meets all statutory requirements for authorizing a wastewater discharge, including those limitations and conditions believed necessary to protect human health, aquatic life, and the beneficial uses of waters of the State of Washington. The Department proposes that this permit be issued for five years.